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EXAMINER

LE, LANA N

ART UNIT

PAPER NUMBER

2618

DATE MAILED: 03/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/633,696

Applicant(s)

DORNING, PHILIP

Examiner

Lana N. Le

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17, 19-21 and 23-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17, 19-21 and 23-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 18 and 22 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claim 27 is objected to because of the following informalities: in line 9, after "second mixer", a comma is needed. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

3. Claims 1-3, 15-17, 19-21, and 24-28 are rejected under 35 U.S.C. 102(e) as being anticipated by Seymour (GB 2,236,225).

Regarding claim 1, Seymour discloses a mixer arrangement (fig. 1) comprising:

a first mixer (23) having at least one signal input (signal input from 19) for receiving a first signal having a frequency of which is to be changed (changed to a lower frequency), at least one frequency input for receiving an input frequency (LO frequency from 27, R2) and at least one output (output from 23 to 29) (page 4, lines 11-20), the first mixer (23) being configured to mix the first signal (input to 23) with an input frequency (input frequency from 27) to provide an output (output from mixer 23) which is output by the at least one output (page 4, lines 11-20);

a second mixer (21) having at least one frequency input for receiving an input frequency (input frequency from filter 15) and having at least one output (output from mixer 21) (page 4, lines 11-20), at least one output of the first mixer (23) and at least one output of the second mixer (21) being combined (summed at 29) to cancel unwanted components (unwanted spurious signal components) from the input frequency in the outputs of the mixers (21, 23) (page 4, lines 11-20; page 6, lines 19-22; page 8, lines 21-27).

Regarding claim 2, Seymour discloses the mixer arrangement as claimed in claim 1, wherein the first mixer (23) comprises a single signal input (single input from 19), a single frequency input (from oscillator 27) and a single output (output of 23) and wherein the second mixer (21) comprises a single frequency input (frequency input from 27) and a single output (output of mixer 21) (see figure 1).

Regarding claim 3, Seymour discloses the mixer arrangement as claimed in claim 2, further comprising a combiner (29) to combine the single output of the first mixer (23) and the single output of the second mixer (21) (page 4, lines 11-20).

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Regarding claim 15, Seymour discloses the mixer arrangement as claimed in claim 1, wherein the at least one output of the first mixer (23) comprises a first signal component (A2) resulting from mixing an input signal with a frequency and a second signal component (A1) resulting from a frequency signal, the second signal component being an unwanted component (A1) (page 7, lines 1-2).

Regarding claim 16, Seymour discloses the mixer arrangement as claimed in claim 15, wherein the at least one output of the second mixer (21) comprises a signal component resulting from the frequency signal, the signal component being an unwanted component (A2) (page 7, lines 1-2).

Regarding claim 17, Seymour discloses a mixer arrangement as claimed in claim 15, wherein the at least one output of the first mixer is combined (via 29) with the at least one output of the second mixer (21) so that the signal component of the output of the second mixer cancels the second signal component of the output of the first mixer (23) (page 4, lines 11-20).

Regarding claim 19, Seymour discloses the mixer arrangement as claimed in claim 1, wherein the first and second mixers (23, 21) having similar configurations.

Regarding claim 20, Seymour discloses the mixer arrangement as claimed in claim 1, wherein the at least one frequency input of the first and second mixers (21, 23) are arranged to receive a frequency from a common frequency source (25, 27).

Regarding claim 21, Seymour discloses the mixer as claimed in claim 20, wherein the common frequency source includes a local oscillator (25).

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Regarding claim 24, Seymour discloses a mixer arrangement as claimed in claim 1, wherein the mixer arrangement is incorporated in a wireless telecommunications entity (page 1, lines 1-3; page 7, line 25 – page 8, line 2).

Regarding claim 25, Seymour discloses the mixer arrangement as claimed in claim 24, wherein said wireless telecommunications entity is one of a base station and a mobile station containing the radio transceivers in a digital radio communication system (page 1, lines 1-3; page 7, line 25 – page 8, line 2).

Regarding claim 26, Seymour discloses the mixer arrangement as claimed in claim 1, wherein the mixer arrangement is incorporated in an image rejection mixer (page 1, line 24 – page 2, line 3).

Regarding claim 27, Seymour discloses a method for mixing signals in a mixer arrangement, the method comprising:

receiving a first signal at a first mixer (23), wherein the first signal includes a frequency to be changed (to be changed to a lower frequency; page 4, lines 11-20);

receiving a first input frequency (LO frequency from 27, R2) input at the first mixer (23) mixing the first signal with the frequency input to provide an output (output from 23 to 29) from the first mixer (23);

receiving a second input frequency (input filter from filter 15) at a second mixer (21), outputting a second output (output from mixer 21) from the second mixer (21) (page 4, lines 11-20), combining (via 29) the first output of the first mixer and the second output of the second mixer to cancel unwanted components (unwanted spurious signal components) from inputs of the first mixer (23) and the second mixer (21) of a

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mixer arrangement (21, 23) (page 4, lines 11-20; page 6, lines 19-22; page 8, lines 21-27).

Regarding claim 28, Seymour discloses a mixer arrangement (fig. 1) including:
first receiving means (signal input from 19) for receiving a first signal at a first mixer (23), wherein the first signal includes a frequency to be changed (changed to a lower frequency),

second receiving means (at mixer 23) for receiving a first input frequency input (LO frequency from 27, R2) at the first mixer mixing means (23) for mixing the first signal (RF signal) with the frequency input (LO frequency) to provide a first output from the first mixer (23) (page 4, lines 11-20);

third receiving means for receiving a second input frequency at a second mixer (21), outputting means for outputting a second output (output from mixer 21) from the second mixer (21); and combining means (29) for combining (summed at 29) the first output of the first mixer (23) and the second output of the second mixer (21) to cancel unwanted components from inputs of the first mixer (21) and the second mixer (21) of a mixer arrangement (21, 23) (page 4, lines 11-20; page 6, lines 19-22; page 8, lines 21-27).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 5-6 and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seymour (GB 2,236,225) in view of Rokos (GB 2,239,143).

Regarding claim 5, Seymour disclose the mixer arrangement as claimed in claim 1, wherein Seymour does not disclose the first mixer configured to provide a first output and a second output and the second mixer is configured to provide a third output and a fourth output. Rokos discloses a first mixer (13) is configured to provide a first output (I inverse) and a second output (I) and a second mixer (14) is configured to provide a third output (Q inverse) and a fourth output (Q) (figs. 2-3; page 3, lines 21-22). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have each of the mixer of Seymour have two outputs in order to provide reduce output noise as suggested by Rokos (page 3, lines 2-4).

Regarding claim 6, Seymour and Rokos disclose the mixer arrangement as claimed in claim 5, wherein Robos disclose the mixer arrangement is such that the first output (I inverse) of the first mixer (13; fig. 2) is an inverse of the second output (I) of the first mixer (13) and the third output (Q inverse) at the second mixer (14) is an inverse of the fourth output (Q) of the second mixer (14). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have inverse outputs in order to reduce errors resulting from mismatch of identical components as suggested by Rokos (page 2, line 36 – page 3, line 2).

Regarding claim 12, Seymour and Rokos disclose the mixer arrangement as claimed in claim 1, wherein Seymour does not disclose the first mixer having two frequency signal inputs and the second mixer having two frequency signal inputs. Rokos discloses the first mixer (13; fig. 2) has two frequency signal inputs (B, C) and the second mixer (14) has two frequency signal inputs (A, D) (page 2, line 36 – page 3, line 2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have two frequency inputs in order to reduce output noise from each of the doubly balanced mixer (page 3, lines 1-3).

Regarding claim 13, Seymour and Rokos disclose a mixer arrangement as claimed in claim 12, wherein Rokos discloses one frequency input to each of the first and second mixers (13, 14) is configured to receive an inverse frequency signal (A, C) which is an inverse of a frequency signal which another frequency signal input (B, D) of each of the first and second mixers is arranged to receive respectively. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have inverse outputs in order to reduce errors resulting from mismatch of identical components as suggested by Rokos (page 2, line 36 – page 3, line 2).

6. Claims 7 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seymour (GB 2,236,225) in view of Kuo (US 6,510,314).

Regarding claim 7, Seymour discloses the mixer arrangement as claimed in claim 1, wherein Seymour does not disclose a first mixer including a first signal input and a second signal input, the arrangement being such that the first signal input is an inverse of the second signal input. Kuo discloses a first mixer (fig. 2) includes a first

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signal input (first input at port 20) and a second signal input (second RF input signal at port 20), the arrangement being such that the first signal input is an inverse of the second signal input (col 5, lines 2-7). It would have been obvious to one of ordinary skill in the art at the time the invention was made to receive an input and also its inverse in order to provide balanced RF inputs to a double balanced mixer as is well known in the art.

Regarding claim 23, Seymour discloses a mixer arrangement as claimed in claim 1, wherein Seymour does not disclose the mixer arrangement is incorporated in an integrated circuit. Kuo discloses the mixer arrangement is incorporated in an integrated circuit (col 3, lines 28-33). It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the mixer arrangement on an integrated circuit to reduce cost and size.

7. Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seymour (GB 2,236,225) in view of Kalinin et al (US 2005/0,172,718).

Regarding claim 8, Seymour discloses the mixer arrangement as claimed in claim 1, wherein Seymour does not disclose the second mixer has two inputs, the two inputs being connected. Kalinin et al disclose wherein the second mixer (15) has two inputs 15a, 15b), the two inputs being connected (see fig. 2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the mixer have two inputs that are connected in order to excite the resonant structure with a

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reference signal of variable frequency encompassing a possible resonant frequency of the resonant structure as suggested by Kalinin et al.

Regarding claim 9, Seymour and Kalinin et al disclose a mixer arrangement as claimed in claim 8, wherein Kalinin et al disclose a resistive element (14) is provided between the two inputs of the second mixer. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the resistor between the two inputs in order to vary the excitation signal to better obtain the resonant frequency.

Regarding claim 10, Seymour and Kalinin et al disclose the mixer arrangement as claimed in claim 9, wherein Seymour and Kalinin et al do not disclose the resistive element of a second mixer (25) has a resistance substantially equal to a resistance on at least one signal input of the first mixer (15). However, it is notoriously old in the art to set the resistance value to be equal. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have equal resistances in the two mixers in order to provide balanced inputs to the double balanced mixer of Seymour.

8. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Seymour (GB 2,236,225) in view of Mourant (US 6,687,494).

Regarding claim 11, Seymour discloses the mixer arrangement as claimed in claim 1, wherein Seymour does not disclose the second mixer has two inputs, at least one input of the two inputs is connected to ground. Mourant discloses a second mixer (21) has two inputs (one to transistors 36, one to transistors 37), at least one input

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(input to 31, 32) of the two inputs is connected to ground via winding 14 (see fig. 1A). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have one input connect to ground in order to have one end of the RF input balun transformer grounded to zero.

9. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Seymour (GB 2,236,225) in view of Manuel (US 5,661,485).

Regarding claim 14, Seymour discloses the mixer arrangement as claimed in claim 5, wherein Seymour does not disclose the first output of the first mixer is connected to the first output of the second mixer and one other output of the first mixer is connected to the second output of the second mixer. Manuel discloses a mixer arrangement wherein the first output (cross output to 53; fig. 4) of the first mixer (56) is connected (via hybrid coupler 55) to the first output (direct output to 53) of the second mixer (57) and one other output (direct output to 52) of the first mixer (56) is connected to the second output (cross output to 53) of the second mixer 57 (via hybrid coupler 55) (col 4, lines 6-20). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add the cross coupling in order to suppress one of the input sidebands of the image mixer as suggested by Manuel.

Allowable Subject Matter

10. Claim 4 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claim 4, Seymour disclose a mixer arrangement as claimed in claim 3, wherein Seymour and the cited prior art fail to disclose the combiner is configured to select an output from one of the first and second mixers, to invert the selected output, and to add the inverted selected output to the non-selected output of the first and second mixers.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lana N. Le whose telephone number is (571) 272-7891. The examiner can normally be reached on M-F 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward F. Urban can be reached on (571) 272-7899. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lana Le

Lana M. Le
03-08-06
LANA LE
PRIMARY EXAMINER